Public Executive Summary

Title: Ultra-Deepwater Resources to Reserves Development and Acceleration through Appraisal

Name of Offeror: The University of Texas at Austin
Project Director/Principal Investigator: Sanjay Srinivasan

Additional participants: Bureau of Economic Geology, Marathon Oil

Solicitation Number: RFP2008DW2701 (08121-2701-03)

Project Start Date: January 28, 2010
Project End Date: December 31, 2012

Total Estimated Cost:	$ 250,632.00
RPSEA Maximum Share:	197,824.00
UT Austin Cost Share:	50,301.00

PROJECT DESCRIPTION:

This study focuses on developing a framework for analyzing and modeling reservoir flow connectivity in ultra-deepwater systems. Specifically, viable reservoir analogs for ultra-deepwater systems in the Gulf of Mexico will be reviewed and summarized. A new geological modeling framework based on multiple-point geostatistics will be developed to accurately represent the reservoir architecture and characteristics of depo-elements. This new modeling tool is critical for representing flow connectivity in geologic models for ultra-deepwater reservoirs.

The study also focuses on inferring flow connectivity from well test information. A novel multiple point proxy is proposed that represents the well test response in terms of the flow connectivity and a technique for calibrating the parameters of the proxy expression is presented.

The methods and techniques developed in this research will be applied on the data for the Ewing block of the Lobster Field in the Gulf of Mexico. The available well log and well production information will be analyzed in order to develop a model for the spatial distribution of the main reservoir facies. Statistics and manifestations of physical processes observed in the analogs for ultra-deepwater systems will be used to condition the reservoir model for the Ewing area. The model will then be subjected to a history match analysis. The process of calibrating a multiple point proxy will be implemented on the history matched model.

PROJECT OBJECTIVES:

The overall objective of the proposed research is to facilitate the development of ultra-deepwater resources by developing techniques to assess the connectivity characteristics of deepwater sediments based on analysis of reservoir analogs, reservoir databases and reservoir model for a mature reservoir. In addition, a key focus will be the development of guidelines for acquisition of additional reservoir information (e.g., well tests) using value of information concepts.

Additional objectives include the following:

- Prove that geologic models can be developed based on appraisal data that are robust in capturing the reservoir characterization that impacts actual dynamic reservoir performance. Validation of the process will be demonstrated by the match to the Lobster production performance.
- Determine the level of details that can be obtained from well test data alone.

KEY DELIVERABLES:

To support and achieve the objectives, a report of the findings will include the following:

- Development of spatial statistical measures for probing the relationship between geologic and flow connectivity.
- Probabilistic assessment of reservoir flow connectivity conditioned to geologic parameters using a reservoir database.
- Evaluate the impact of diagenesis on geologic and flow connectivity.
- Model construction for spatial distribution of bypassed oil based on reservoir specific information (well and production data), and model probe using statistical connectivity measures. Quantification of the relationship between reservoir and flow connectivity while accounting for uncertainty in reservoir geology.
- Evaluation of the means of measuring the data necessary for properly utilizing the quantitative relationship between reservoir and flow connectivity, in order to better delineate producible reserves during the appraisal phase.
- Assessment of the complex reservoir characterization of turbidite reservoirs through seismic attributes and validation of new and existing techniques through matching of production performance using the Lobster Field data.
- Validation of proxy functions developed for well test analysis using pressure data and history match results.

EXPECTED IMPACTS AND BENEFITS:

As a result of this work, it is expected that these techniques will be able to be applied to new and existing fields and reservoirs to form better and faster estimates of recoverable reserves. Fewer long term well tests equate with lower risk of well control situations, lower overall costs, and less exposure to uncertainties. A narrowing of the range of hydrocarbon production and reserves predictabilities results in better topsides and subsea design practices, more efficient reserve recovery plans, and more effective practices.

PARTICIPANTS:
The University of Texas at Austin and the Bureau of Economic Geology will lead the investigation. The Lobster Field data and information will be provided by Marathon Oil.

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